

## Special Circular 149

The establishment and management of quality turfgrass under shaded conditions often is possible if the basic requirements for turfgrass growth are known and understood. Trees have extensive root systems (often quite shallow) that enable them to utilize huge amounts of water and nutrients, and they have dense leaves that severely restrict the light intensity under the trees. These three factors — competition for water, nutrients, and light — are the basic causes of turfgrass failure under shaded conditions. Poor drainage also contributes to poor turfgrass development in shaded areas. Poorly drained shaded areas often become infested with moss, which provides additional turfgrass competition.

Effects of shade on turfgrasses include shortened roots, reduced shoot density, erect and elongated growth of stems and leaves, decreased plant vigor, increased susceptibility to disease, and reduced wear tolerance. Environmental conditions in shade often are conducive to disease development.

In setting up a turfgrass management program every effort should be made to reduce or eliminate this competition for water, nutrients, and light and to provide adequate soil drainage.

A number of establishment and maintenance practices may improve turfgrass under trees:

- Use shade tolerant grass species and/or varieties. Fine fescues (red, Chewings, sheep, hard) and rough bluegrass (*Poa trivialis*) are the most shade tolerant grasses. Rough bluegrass (variety Sabre) performs best in shaded areas that are constantly moist; fine fescues prefer drier soils and do not tolerate constantly wet soils. Tall fescues may be used in areas of moderate shade, and the Kentucky bluegrass varieties Glade and Bensun tolerate light shade.
- Fertilize the grass at slightly higher than the normal rate used for that species or variety in sunny areas. Rough bluegrass and Kentucky bluegrass require more nitrogen than the fine fescues or tall fescue. Nitrogen overfertilization of the fine fescues may be detrimental. Fertilizers having a ratio of 2-1-1 or 1-1-1 and containing 30 percent or more of the total nitrogen as slow release are recommended. The higher than normal rate of fertilization provides some nutrients for the trees.
- Water deeply and infrequently. Frequent, shallow irrigation may result in the development of shallow tree roots, whereas deep, infrequent watering tends to develop deeper tree roots.
- Maintain a soil reaction (pH 6.3 to 7.0) favorable to the grass. Apply ground agricultural limestone according to a lime requirement test to maintain the desired pH.

- Remove those trees that are not essential to the beauty and/or utility of the landscape plan.
- Prune tree branches as much as possible without destroying the function and the beauty of the tree.
- Prune shallow tree roots as much as possible.
- Plant new trees wisely, taking into consideration the number of trees already present, the density of the trees already present, and the light intensity reduction potential of the new trees. Shade trees should be planted 40 to 100 feet apart, depending on the mature size and density of the tree species. Oaks, honeylocust, linden, ginkgo, and red maples are commonly recommended. Avoid shallow-rooted trees such as Norway maples and silver maples.
- Provide good soil drainage and aeration to allow adequate penetration of nutrients, water, and air into the soil.
- Fall grass seedings are recommended over spring seedings because of less competition from the trees in the fall. However, fall-seeded areas must be kept free of leaves to prevent smothering of the new seedlings.
- Adjust mowing practices to suit the grass species present. In most instances, the clipping height should be considerably higher (approximately one inch higher) than it would be for that particular grass in the open sun. Never remove more than one-third of the total leaf surface at a given mowing.
- Control weeds to improve the appearance of the turf and reduce the competition for light, water, and nutrients. Be sure that the herbicides are safe for use under the tree canopy.
- Remove leaves and other debris promptly by raking or sweeping. Leaves allowed to accumulate may smother the grass, provide favorable conditions for turfgrass disease development, or harbor harmful insects.
- Use other types of ground covers (nongrasses) where environmental modifications are difficult or the cost is prohibitive and where grasses will not provide adequate cover. Plants such as periwinkle, pachysandra, purple wintercreeper, and English ivy are suitable ground covers.

Degree of shade	Grasses	Other ground covers
Heavy	<ul style="list-style-type: none"> <li>• Fine fescues(creeping, red, Chewings, hard, sheep)</li> <li>• <b>or</b></li> <li>• Rough bluegrass (wet conditions)</li> </ul>	<ul style="list-style-type: none"> <li>• Pachysandra</li> <li>• <b>or</b></li> <li>• Periwinkle</li> <li>• <b>or</b></li> <li>• English ivy</li> <li>• <b>or</b></li> <li>• Purple wintercreeper</li> </ul>
Medium	<ul style="list-style-type: none"> <li>• Fine fescues</li> <li>• <b>or</b></li> <li>• Tall fescues</li> <li>• <b>or</b></li> <li>• Rough bluegrass</li> </ul>	
Light	<ul style="list-style-type: none"> <li>• Fine fescues</li> <li>• <b>or</b></li> <li>• Tall fescues</li> <li>• <b>or</b></li> <li>• Shade tolerant Kentucky bluegrass (Glade, Bensun)</li> <li>• <b>or</b></li> <li>• Fine fescues</li> </ul>	

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Penn State College of Agricultural Sciences research, extension, and resident education programs are funded in part by Pennsylvania counties, the Commonwealth of Pennsylvania, and the U.S. Department of Agriculture.

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Issued in furtherance of Cooperative Extension Work, Acts of Congress May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture and the Pennsylvania Legislature. T. R. Alter, Director of Cooperative Extension, The Pennsylvania State University.

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